

Remarks

The Applicants have amended the Specification to place it into final form for allowance. Entry into the official file is respectfully requested.

Claim 5 has been amended to change “12 μm or less” to “5 μm or less.” Entry into the official file is respectfully requested.

Claims 1-3 and 7-8 stand rejected under 35 U.S.C. §103 over the hypothetical combination of Yoshida ‘337 with Kurita. The Applicants note with appreciation the Examiner’s detailed comments hypothetically applying that combination against Claims 1-3 and 7-8. The Applicants nonetheless respectfully submit that even if one skilled in the art were to make the hypothetical combination, the steel produced from such a combination would still not result in what the Applicants claim in those rejected claims. Details are set forth below.

Referring first to Claim 1, the Applicants specifically claim a steel that has a “ferrite-cementite” structure or a “ferrite-cementite-pearlite” structure, both having a grain size of 7 μm or less. The claimed steels thus exhibit a rotating bending fatigue strength of 800 MPa or more.

The Applicants respectfully submit that Kurita fails to disclose either of those structures. In sharp contrast, Kurita discloses, as correctly set forth in the rejection, a ferrite-pearlite structure. There is utterly no mention of a “cementite” structure taken alone or taken as part of a “ferrite-cementite” structure or a “ferrite-cementite-pearlite” structure. This results in strengths of 550 MPa or less.

That is not to say that other structures are not mentioned. Other structures such as bainite and martensite, for example, are disclosed in Kurita. In that regard, the Applicants invite the Examiner’s attention to Col. 4 in the paragraph beginning at Line 32. Ferrite, pearlite, bainite and martensite are

all disclosed at that point. Bainite and martensite are disclosed as structures that should be avoided. Instead, Kurita teaches that the proper structure is “ferrite-pearlite.”

Therefore, the Applicants respectfully submit that Kurita fails to disclose the fundamental specifically claimed aspect of a “ferrite-cementite” structure or a “ferrite-cementite-pearlite” structure. This is, of course, in addition to the failure of Kurita to teach the claimed grain sizes of 7 μm or less as frankly acknowledged in the rejection. Thus, Kurita fails to disclose two fundamental claimed aspects.

The rejection turns to Yoshida to cure the failure to disclose a grain size of 7 μm or less. However, Yoshida is not applicable. Yoshida relates to a shaft wherein graphite steel is used. Graphite steel, when high-frequency induction quenching is applied, changes into a two-phase structure of ferrite and martensite or single-phase martensite structure. Therefore, it is not usually used in a state of graphite as precipitated. Graphite steel is steel wherein, as is known, the hardness of the base metal is reduced while workability and machinability are increased by artificially precipitating graphite by heating initially. The material is not used as it is, but is used by hardening a processed component by quench hardening to obtain solid solution of the graphite thereby to have martensite transformation generated and to highly increase the strength. Therefore, Yoshida is obviously quite dissimilar to the content of the Kurita and the Applicants’ claimed subject matter.

Further, graphite has a serious problem. Graphite is melted during quench hardening and produces air gaps at spots which become starting points of fatigue cracks, resulting in shortening of fatigue life. Although no data concerning fatigue life is disclosed in Yoshida, it is presumed from above that fatigue life is at a low level. Thus, Yoshida would not be combined with Kurita. In any event and for the sake of discussion, the Applicants will assume *arguendo* that Yoshida does disclose

grain sizes of 7 μm or less. The problem is that Yoshida does not disclose the other missing component, namely the component of the “ferrite-cementite” structure or the “ferrite-cementite-pearlite” structure. In that regard, Yoshida does not disclose the structures at all. Therefore, those skilled in the art are left completely in the dark as to the Yoshida grain structures.

As a consequence, even if one skilled in the art were to make the hypothetical combination, the steels resulting from that combination would still fail to provide for a steel having a “ferrite-cementite” structure or a “ferrite-cementite-pearlite” structure. The Applicants therefore respectfully submit that hypothetically combining Yoshida with Kurita fails to result in at least one claimed aspect and the rejection must fail. Withdrawal of the rejection is respectfully requested.

There are additional problems with that rejection with respect to Claim 2. Again, assuming *arguendo* that Kurita discloses molybdenum, which it does, the Kurita teachings are not that molybdenum should be added. Instead, Kurita teaches just the opposite. Specifically, Kurita discloses in Col. 6, Line 46 “Mo may not be added.” The Applicants respectfully submit that nothing could be clearer with respect to this subject matter as recited in Claim 2. The Applicants specifically claim adding 0.05-0.6% Mo. Kurita specifically tells those skilled in the art “Mo may not be added.”

The Applicants respectfully submit that such teachings on the part of Kurita hardly motivate those skilled in the art to do just the opposite. The Applicants further respectfully submit that the Applicants having defied the overt teachings of Kurita not to add Mo and the Applicants having done just that is classic evidence of patentable subject matter. In other words, when the applicant does something just the opposite of what the prior art teaches and, surprisingly, finds success, this is classic evidence of patentability. Withdrawal of the rejection as it applies to Claim 2 is also respectfully requested.

Claims 4 and 9 stand rejected under 35 U.S.C. §103 over the further hypothetical combination of Yoshida '924 with Yoshida '337 and Kurita. The Applicants respectfully submit that Yoshida '924 does nothing to cure the deficiencies set forth above with respect to Kurita. Therefore, further hypothetically combining Yoshida '924 would not produce a steel that is the subject matter or suggests the subject matter of Claims 4 and 9. Withdrawal of the rejection is respectfully requested.

Claims 5 and 6 stand rejected under 35 U.S.C. §103 over the further hypothetical combination of Ochi with Yoshida '337 and Kurita. The Applicants respectfully submit that Ochi does nothing to cure the deficiencies set forth above with respect to Kurita. Therefore, further hypothetically combining Ochi would not produce a steel that is the subject matter or suggests the subject matter of Claims 5 and 6. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



T. Daniel Christenbury
Reg. No. 31,750
Attorney for Applicants

TDC/as
(215) 656-3381

In re Application of Toru Hayashi et al.

Serial No.: 10/530,134

Filed: June 9, 2005

For: HIGH-STRENGTH STEEL HAVING HIGH FATIGUE STRENGTH AND METHOD FOR
MANUFACTURING THE SAME**Mail Stop Amendment**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

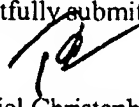
A response to the outstanding official action in the above-identified application is enclosed.

- ☐ Small entity status of this application under 37 CFR §1.9 and §1.27 has been established.
- ☐ This is a Petition for an Extension of Time for the period noted below, as well as for any additional period necessary to render this submission timely.
- ☒ No additional fee is required.

					SMALL ENTITY		OTHER THAN SMALL ENTITY	
TIME EXTENSION PETITION FEE			No. of month(s):		\$0.00		\$0.00	
Subtract time extension fee previously paid			No. of month(s):		(\$0.00)		(\$0.00)	
TOTAL EXTENSION FEE DUE					\$0.00		\$0.00	
CLAIM FEE	CLAIM(S) REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	EXTRA CLAIM(S) PRESENT	RATE	ADD'L CLAIM FEE	RATE	ADD'L CLAIM FEE
TOTAL	19	MINUS	20	= 0	x 25=	\$	x 50=	\$
INDEPENDENT	2	MINUS	3	= 0	x 105=	\$	x 210=	\$
<input type="checkbox"/>	FIRST PRESENTATION OF MULTIPLE CLAIM(S)				+ 185=	\$	+ 370=	\$
					TOTAL	\$	TOTAL	\$0.00

- ☐ Please charge Deposit Account No. 50-2719 in the amount of \$ _____.
- ☐ A check in the amount of \$ _____ is attached.
- ☒ The Commissioner is authorized to charge payment of the following fees associated with this communication or credit any overpayment to Deposit Account No. 50-2719.
- ☒ Any filing fees under 37 CFR §1.16 for the presentation of extra claims.
- ☒ Any patent application processing fees under 37 CFR §1.17.

Respectfully submitted,


 T. Daniel Christenbury, Reg. No. 31,750
 Attorney for Applicant(s)
TDC/as
(215)656-3381